

Common MMAW problems – Causes & Remedies

1.0 COMMON MANUAL METAL ARC WELDING DEFECTS:

The process variables, materials or welding procedures can affect the weld quality. Some of the commonly observed defects in MMA welding and their possible remedies are tabulated below.

<i>Possible Causes</i>	<i>Corrective Actions</i>
-------------------------------	----------------------------------

Weld metal cracks

1.	Too high a weld depth-to-width ratio.	<ul style="list-style-type: none"> Decrease the welding current.
2.	Too small a weld bead.	<ul style="list-style-type: none"> Decrease the travel speed. Select the right diameter of electrode based on the adjoining plates/ jobs.
3.	Rapid cooling of the crater at the end of the weld.	<ul style="list-style-type: none"> Fill craters adequately. Use a back step welding technique at the end to complete the weld bead.
4.	Excessive diffusible H ₂ in the weld.	<ul style="list-style-type: none"> Re-dry the electrode as per recommendation. Reduce the joint restraints.
5.	Too thick or high carbon equivalent (CE) of the plates.	<ul style="list-style-type: none"> Preheat the job based on the CE.

Inclusions

1.	In-sufficient cleaning of slag during multi-pass weld deposit.	<ul style="list-style-type: none"> Clean the previous bead before making subsequent passes.
2.	Turbulence in weld puddle for high travel speeds.	<ul style="list-style-type: none"> Reduce the travel speed.

Porosity

1.	Inadequate protection of arc and weld pool.	<ul style="list-style-type: none"> Eliminate drafts (from fans, open doors etc.) blowing into the welding arc. Reduce the arc length.
2.	Moisture content of the electrode	<ul style="list-style-type: none"> Re-dry the electrode before use as per the recommendation of the manufacturer.

Common MMAW problems – Causes & Remedies

<i>Possible Causes</i>		<i>Corrective Actions</i>
3.	Electrode contamination.	<ul style="list-style-type: none"> • Use clean and dry electrodes. • Eliminate contamination of electrode with any lubricant.
4.	Work-piece contamination.	<ul style="list-style-type: none"> • Remove oil, grease, rust, paints, dusts, etc from the work surface prior to welding.
5.	Arc blow.	<ul style="list-style-type: none"> • Keep ground connection as far away from the joint as possible. • On small jobs, keep ground connection at start and weld towards a heavy tack. • Hold short arc. • Weld towards a heavy tack or towards a weld already made. • Use back step sequence on long welds.
6.	Excessive weaving.	<ul style="list-style-type: none"> • Reduce the extent of weaving.
7.	Starting porosity – low hydrogen electrodes.	<ul style="list-style-type: none"> • Strike the arc on a scrap plate and restart the arc on the joint. • Strike the arc on the joint but 20mm ahead of the actual starting point and then move the arc backward towards the real starting point.

Incomplete fusion

1.	Work-piece surface not clean.	<ul style="list-style-type: none"> • Clean all groove surfaces and weld zones.
2.	Insufficient heat input.	<ul style="list-style-type: none"> • Increase the current and preheat the job. • Decrease the travel speed. • Place weld pass correctly next to each other.
3.	Too large a weld puddle.	<ul style="list-style-type: none"> • Reduce arc weaving.
4.	Arc blow.	<ul style="list-style-type: none"> • Reduce the propensity of arc blow as mentioned above.
5.	Improper joint design.	<ul style="list-style-type: none"> • Select proper groove design.

Undercut

1.	Excessive welding current.	<ul style="list-style-type: none"> • Reduce the current.
2.	Too high a travel speed.	<ul style="list-style-type: none"> • Decrease the travel speed.

Common MMAW problems – Causes & Remedies

<i>Possible Causes</i>	<i>Corrective Actions</i>
------------------------	---------------------------

Lack of penetration

1.	Improper joint preparation.	<ul style="list-style-type: none"> • Provide/Increase root openings in butt-joint. • Decrease the height of root face.
2.	Improper diameter selection of welding electrode.	<ul style="list-style-type: none"> • Select lower diameter electrode in the root run. • Select proper travel angle to achieve maximum penetration.
3.	Inadequate heat input.	<ul style="list-style-type: none"> • Set the desired current. • Preheat the job wherever required.

Excessive melt through

1.	Excessive heat input.	<ul style="list-style-type: none"> • Reduce the welding current. • Increase the travel speed.
2.	Improper joint preparation.	<ul style="list-style-type: none"> • Reduce excessive root opening. • Increase the height of the root face.

